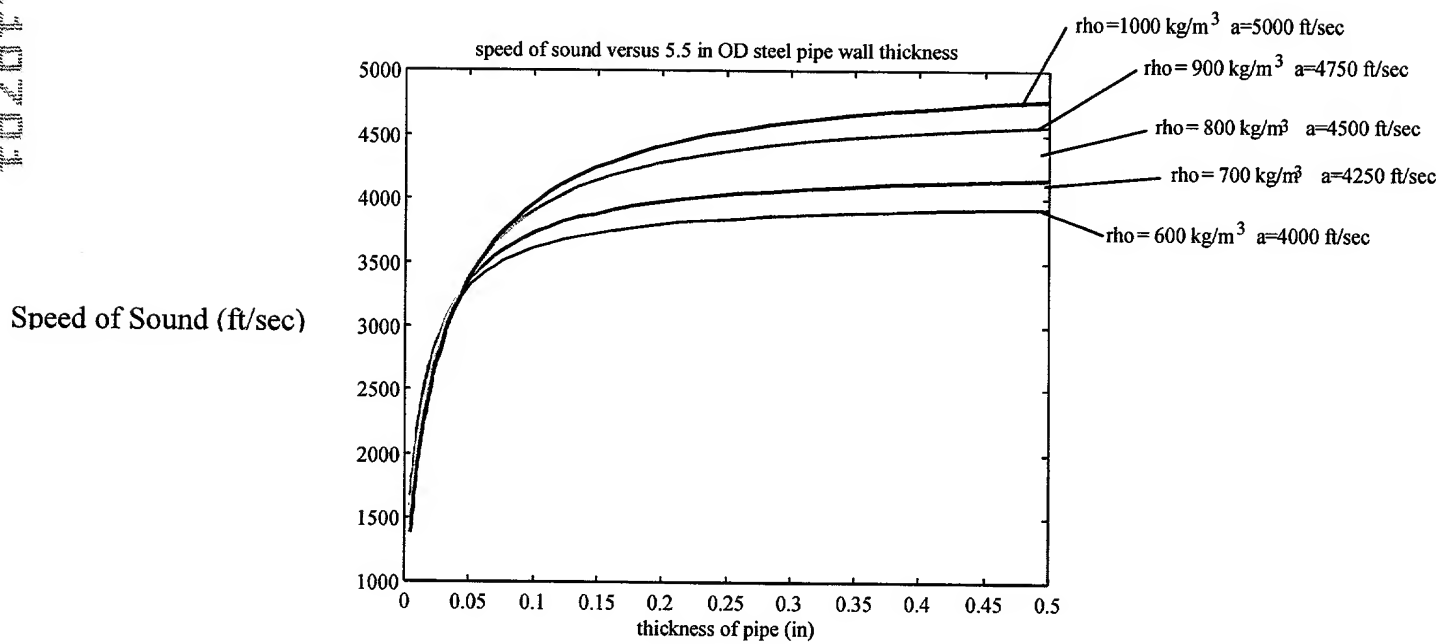
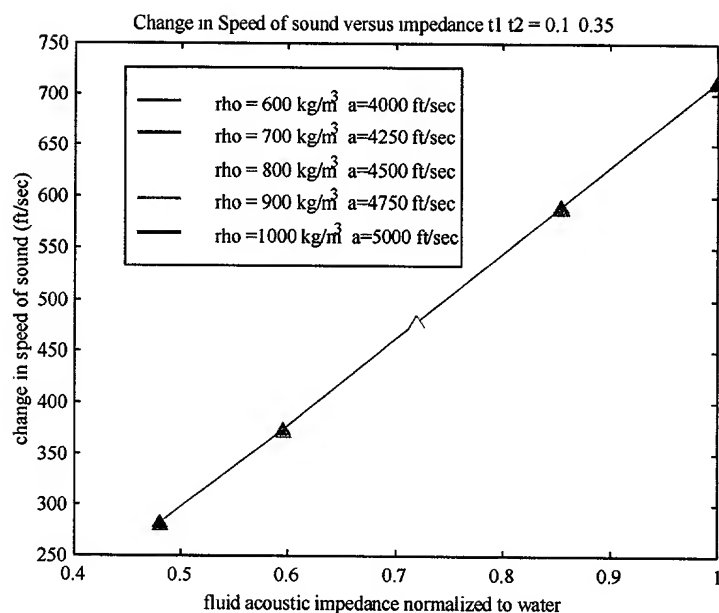


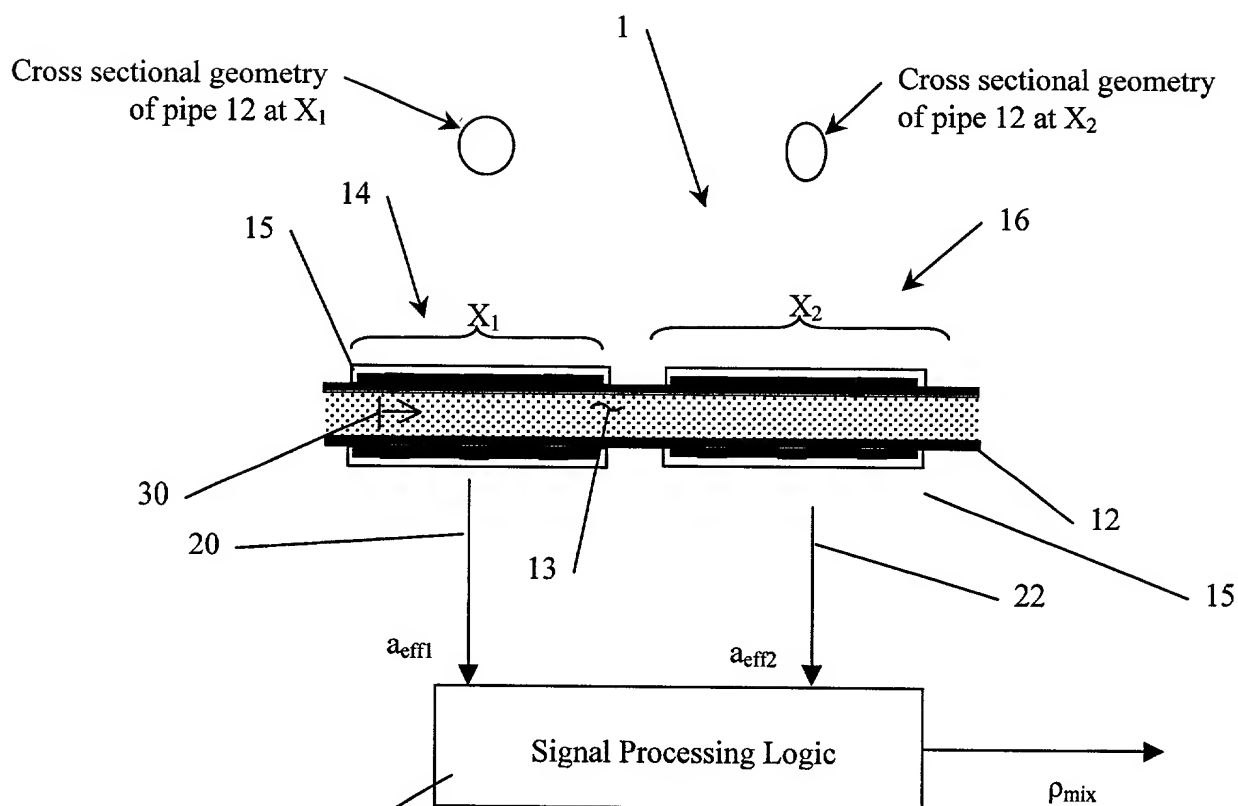
### Figure 1



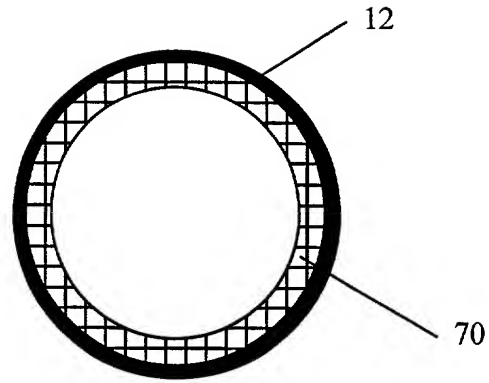
## Figure 2



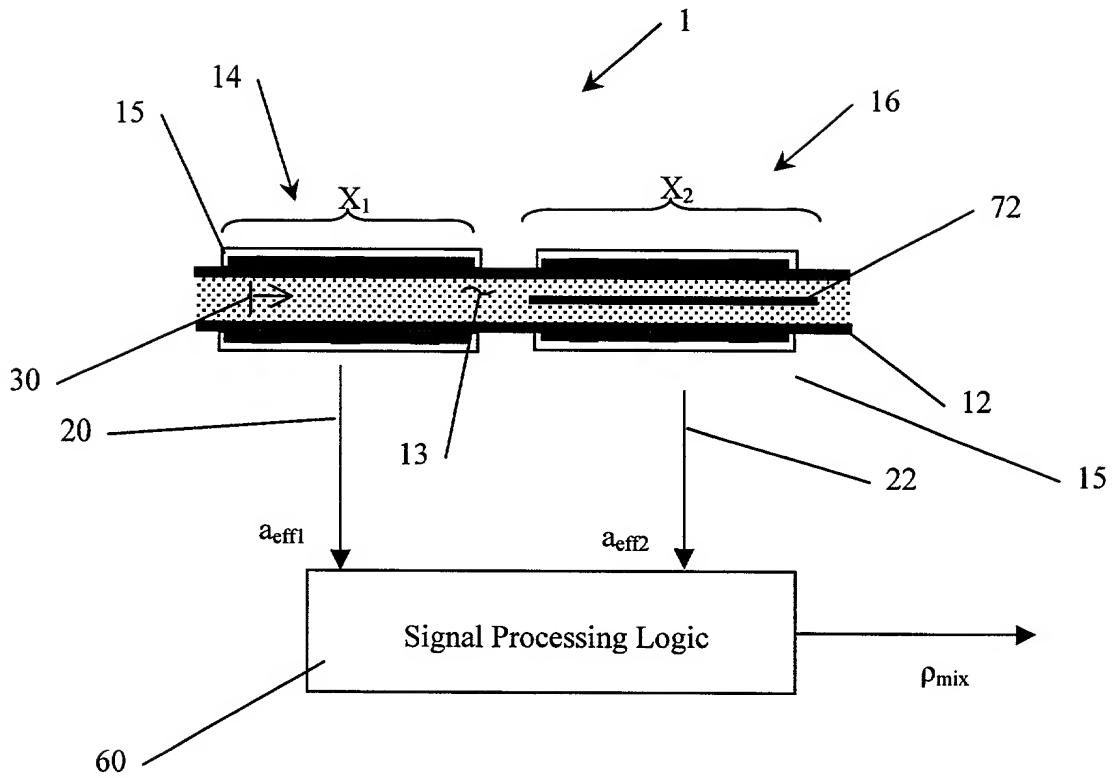
**Figure 3**



**Figure 4**



**Figure 5**



**Figure 6**

alpha = 10 compliance(con,oil,brine) = 4.8309e-011 8.405e-010 4.3121e-010

speed of sound (m/sec)

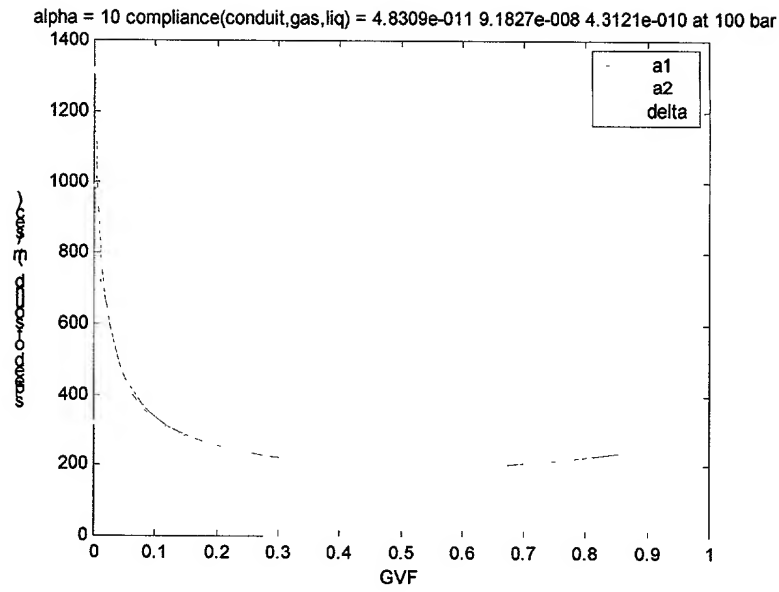
ovf

nom conduit  
soft conduit  
delta

ovf	nom conduit (m/sec)	soft conduit (m/sec)
0.05	1410	1410
0.10	1410	1410
0.15	1380	1380
0.20	1370	1370
0.50	1250	1250
0.60	1230	1230
0.75	1200	1200

The diagram illustrates a dual-channel acoustic sensor system. A central vertical tube (74) is connected to a horizontal tube (1) that passes through a porous medium (12). The horizontal tube is divided into two sections,  $X_1$  and  $X_2$ , by a central vertical partition (14). The porous medium (12) is flanked by two solid layers (15). The horizontal tube is connected to two vertical tubes (20 and 22) that lead to a 'Signal Processing Logic' block (60). The signal processing logic block outputs a mixture ratio  $\rho_{mix}$ . The effective acoustic path lengths are labeled  $a_{eff1}$  and  $a_{eff2}$ .

### Figure 8



**Figure 9**